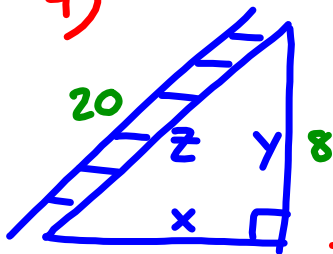


Homework Check:

4)



$$(a) \quad x^2 + y^2 = z^2$$

(b) Have:

$$z = 20ft$$

$$y = 8ft$$

(c) Need

$$\frac{dy}{dt}$$

$$(d) \quad 2x \frac{dx}{dt} + 2y \frac{dy}{dt} = 2z \frac{dz}{dt} \quad \frac{dx}{dt} = 4 \frac{ft}{s}$$

$$(e) \quad \frac{dz}{dt} = 0$$

$$(f) \quad \begin{aligned} x^2 + 8^2 &= 20^2 \\ x^2 + 64 &= 400 \\ x^2 &= 336 \\ x &= \sqrt{336} \end{aligned}$$

Ladder slides
down @ $\frac{\sqrt{336}}{2} \frac{ft}{s}$

Plug all info in:

$$2(\sqrt{336})(4) + 2(8) \frac{dy}{dt} = 2(20)(0)$$

$$8\sqrt{336} + 16 \frac{dy}{dt} = 0$$

$$8\sqrt{336} = -16 \frac{dy}{dt}$$

$$\frac{8\sqrt{336}}{-16} = \frac{dy}{dt}$$

$$-\frac{\sqrt{336}}{2} = \frac{dy}{dt}$$

- 6) a) increasing b) stays same
 $\frac{dr}{dt} = 0$

1) Have:

$$r = 20 \text{ cm}$$

$$\frac{dr}{dt} = 0 \text{ cm/s}$$

$$\frac{dV}{dt} = -25 \text{ cm}^3/\text{s}$$

2) Need:

$$\frac{dh}{dt}$$

3) $V = \pi r^2 h$

4) $\frac{dV}{dt} = 2\pi r \frac{dr}{dt} h + \pi r^2 \frac{dh}{dt}$ Don't know height but don't need it

$$-25 = \cancel{2\pi(20)(0)h} + \pi(20)^2 \left(\frac{dh}{dt} \right)$$

$$-25 = \pi(400) \frac{dh}{dt}$$

$$\frac{-25}{400\pi} = \frac{dh}{dt}$$

$$\frac{-1}{16\pi} = \frac{dh}{dt}$$

height drops @ $\frac{1}{16\pi} \text{ cm/s}$